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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G06F 17/30, 17/60

A2

(11) International Publication Number: WO 99/52042

(43) International Publication Date: 14 October 1999 (14.10.99)

(21) International Application Number: PCT/SE99/00518

(22) International Filing Date: 31 March 1999 (31.03.99)

(30) Priority Data:
9801181-0 3 April 1998 (03.04.98) SE

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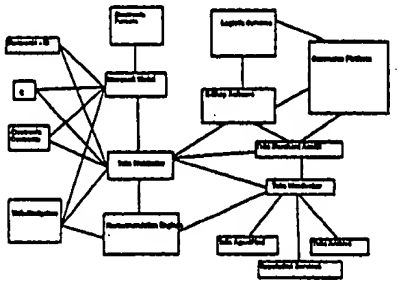
(81) Designated States: EE, LT, LV, NO, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
Without international search report and to be republished upon receipt of that report.

(54) Title: TELECOMMUNICATION TRANSMISSION SYSTEM ADAPTED FOR AN ELECTRONIC MARKET PLACE



(57) Abstract

The Telia agent based marketplace provides users with a personal software agent, called a WebButler. The WebButler provides support for the user and enables him/her to specify the particular buy, or sell, contracts in which he/she is interested. Commercial Merchants can also specify items for sale, in electronic stores, through a function called Merchant Assist. The main task of the Agent Find Service, to which the present invention relates, is to provide WebButlers and Merchant Assists with information on which other agents (WebButler and/or Merchant Assists) have corresponding interests. In addition to its primary function, i.e. to match corresponding interests between agents, AgentFind also provides value added services, such as marketing statistics, information on requested interests, information brokerage and advertisement services etc. Since the interests of each WebButler frequently change, the AgentFind database is continuously updated. Automatic coordination mechanisms are, therefore, provided. The system provides ratings for the level of correspondence between matching interests, since it is rare that interests correspond exactly. Based on the rating, agents (WebButler, or Merchant Assist) can automatically prioritise which of the other agents (WebButler, or Merchant Assist) should be contacted. The present invention can be seen as the next generation search engine for agents. AgentFind has a data synchronisation mechanism which ensures that the data held on the AgentFind databases is consistent with that held by WebButlers and MerchantAssists.

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TELECOMMUNICATION TRANSMISSION SYSTEM ADAPTED FOR AN ELECTRONIC MARKET PLACE

The present invention relates to a telecommunications transmission system adapted to provide a platform for an electronic market place, in particular an agent orientated electronic market place, a service provider's server, a search engine for use with an electronic market place and a method of operating an agent oriented search engine.

The present invention is directed to, among other things, methods of operating the physical infrastructure associated with a telecommunications transmission platform used to support the provision of telecommunications based services. It is necessary to draw a clear distinction between the operation of an electronic market place, which may be modelled on real world market places, and the telecommunications infrastructure used to provide a platform on which the electronic market place operates. It must be recognised that the methods of commerce used on, for example the Internet, and methods of operating the technical elements of the Internet are distinct.

Internet use has dramatically increased. Many people now have access to the Internet, not only from their offices but also from their homes. Through the development and deployment of secure identification systems, electronic payment systems etc., electronic commerce, usually referred to as e-commerce, on the Internet is becoming an acceptable way of conducting business safely and securely.

It is considered by many market research organizations that electronic commerce is one of the fastest growing areas on the Internet because it not only gives an Internet user a more convenient and time-saving shopping experience, but it also enables merchants, trading on the Internet, to save money through the use of more cost-efficient operations including, inter alia, business process re-engineering at the enterprise level increasing competitiveness through lower prices and the ability to introduce one-to-one marketing techniques.

Many companies have realized the impact and potential that agent orientated services will have on e-commerce on the Internet, both today and in the future. For example, Netscape has announced that agent-based search engines will be introduced in coming releases, and Jango already uses a search engine for commercial information based on agent orientation. In addition, Firefly and NetPerception have introduced Recommendation Engines which are being used by Amazon.com and other commercially successful web sites. There are also companies, such as Kinetoscope, that offer tools for developing agent-oriented services for the Internet.

The Telia Agentbased MarketPlace provides users with a personal software agent, called a WebButler. The WebButler provides support for the user and enables him/her to specify the particular buy, or sell, contracts in which he/she is interested. Commercial Merchants can also specify items for sale, in electronic stores, through a function called MerchantAssist.

The main task of an AgentFind Service, to which the present invention relates, is to provide WebButlers and MerchantAssists with information on which other agents (WebButlers and/or MerchantAssists) have corresponding interests. This makes the AgentFind service the natural hub of the agent based marketplace. In addition to its primary function, i.e. to match corresponding interests between agents, AgentFind also provides value added services, such as marketing statistics, information on requested interests, information brokerage & advertisement services etc..

Since the interests of each WebButler frequently change, it is essential that the AgentFind database is continuously updated. Automatic coordination mechanisms are, therefore, provided.

One challenge the system must meet is the provision of correct ratings for the level of correspondence between matching interests; since it is rare that interests correspond exactly. Based on the rating, agents (WebButler, or MerchantAssist) can automatically prioritise which of the other agents (WebButler, or MerchantAssist) should be contacted.

WO9952042 [http://www.gettnepatent.com/Login.dog?exam.supportPretch/WO9952042.spc?dbnbal=bottomPatent=WO9952042pen=main]

The present invention provides an infrastructure for implementing the AgentFind service so that it meets these requirements.

The present invention can be seen as the next generation search engine for agents, as opposed to current search engines, such as Alta Vista, which are designed to operate with more, or less, static web sites. The difference is, for example, that the agent oriented search engine, AgentFind, deals with interests specified by users and merchants. These interests are totally focussed on electronic commerce. Since the interests will change more, or less, daily for the participants, it is of a much greater importance for AgentFind to be able to manage consistency than is the case for conventional search engines. It is for this reason that a synchronisation mechanism has been developed. Another difference between AgentFind and known search engines resides in the mechanisms used to rate the correspondence between participants interests. This is required because it is software, WebButlers and MerchantAssists, that will use the result automatically and not humans, as is the case with conventional search engines. It is, therefore, necessary to ensure that the calculation of correspondence ratings takes proper account of interest parameters which are categorized as mandatory and to distinguish these from optional parameters. The algorithm used takes this information into account during the calculation of correspondence ratings, so that the results are much more precise than those produced by current search engines.

According to a first aspect of the present invention, there is provided a telecommunications transmission system adapted to operate as a platform for an agent-based electronic market and including a plurality of end user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of merchant servers, said platform being arranged to support agent-based market interactions between a plurality of agent types, characterised in that:

- said at least one service provider server has logic means for implementing a search engine adapted to interact with WebButlers, MerchantAssists, a user interest data base and a merchant interest database;

- said WebButlers and MerchantAssists are adapted to carry specifications of interest in trade items,

- said search engine is adapted, on request by a first agent having associated therewith a first specification of interest, to identify specifications of interest associated with other agents, which match said first specification of interest, by searching said user interest data base and MerchantAssist database; and

- there are provided means to calculate a correspondence rate for each extracted specification of interest.

Said merchant servers may have catalogue databases holding information on trade items for which MerchantAssists, associated with said merchant servers, carry specifications of interest, and said means to calculate may be adapted to access said catalogue databases to obtain information to facilitate calculation of said correspondence rate.

Said merchant interest database may only hold data relating to product categories and key attributes for trade items for which MerchantAssists carry specifications of interest.

Data relating to a trade items may be partitioned between mandatory parameters and optional parameters, and said mandatory parameters may include an indication of whether a specification of interest relates to a desire to purchase, or sell, and a product category.

Said means to calculate may be adapted to calculate a correspondence rate, Corr_level, between two statements of interest using the following algorithm:

$$Corr_level = 1 - (SUM(OP(X)*F(X)))/X$$

Where:

N = Number of optional parameters in one of said statements of interest

OP(X) = an optional parameter and X has a value between 1 and N, each optional parameter having a value of 1 in the vector

F(X) = a priority weighting factor.

On delivery, by a WebButler, of a first specification of interest to said search engine with a request to identify corresponding specifications of interest, said search engine may search said user interest database and said MerchantAssist database and identify specifications of interest for which all mandatory parameters match said first specification of interest and a list of originators for matching specifications of interest may be delivered to said WebButler.

Logic for collecting data required for calculation of correspondence rates from merchant servers may be assigned to WebButlers.

Said list of originators may be presented to a user as soon as it is available, together with a counter indicating progress toward obtaining additional data needed to calculate correspondence rates and said WebButler may calculate said correspondence rates and cause said list to be updated as and when said correspondence rates are calculated, said updated list being prioritised and including correspondence rates.

Data carried by WebButlers and MerchantAssists may be dynamically synchronised with data held by said search engine.

Said dynamic synchronisation may be achieved by exchanging the following messages between WebButlers and said search engine, and between MerchantAssists and said search engine:

- "Submit Interest";

- "Update of Interest Profile"; and

- "Reference to Agents with Corresponding Interests".

Logic and software, associated with WebButlers, MerchantAssists and said search engine, resident on said service provider server, may be allocated to different servers in said service provider's domain.

Said search engine may be adapted to provide value added services including:

- marketing statistics;

- reports on specifications of interest;

- information brokerage; and

- advertising.

Specifications of interest may be created by using a dynamic editor adapted to request additional information from a user.

Said merchant servers may include conversion means adapted to convert specifications of interest from a merchant's format to a format used by said search engine.

Said merchant interest database and said user interest database may be country, or region, specific.

Said service provider server may have a database containing a black list of product categories which are non-approved for a specific country, or region, and every new product and/or product attribute may be compared with said black list and, if a correspondence is found, may be rejected by said service provider

server.

Said service provider server may be adapted to receive specifications of interest with a storage parameter disconnected so that said specifications of interest are not stored on said user interest database.

According to a second aspect of the present invention, there is provided a service provider server adapted to operate with a telecommunications transmission system, as set forth in any preceding paragraph, characterised in that:

- said service provider server has logic means for implementing a search engine adapted to interact with WebButlers, MerchantAssists, a user interest data base and a merchant interest database;
- said service provider server has resident thereon software associated with said WebButlers and MerchantAssists;
- said WebButlers and MerchantAssists are adapted to carry specifications of interest in trade items;
- said search engine is adapted, on request by a first agent having associated therewith a first specification of interest, to identify specifications of interest associated with other agents, which match said first specification of interest, by searching said user interest data base and MerchantAssist database;
- there are provided means to calculate a correspondence rate for each extracted specification of interest.

According to a third aspect of the present invention, there is provided, in a telecommunications transmission system adapted to operate as a platform for an agent-based electronic market and including a plurality of user terminals arranged

for connection to the Internet, at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent-based market interactions between a plurality of agent types, a method of matching a specifications of interest associated with a WebButler, or MerchantAssist, with specifications of interest associated with other agents, characterised by a search engine interacting with WebButlers and MerchantAssists, on request from said WebButlers, or said MerchantAssists, to search a user interest data base and a merchant interest database, to identify other WebButlers and/or MerchantAssists, having associated therewith matching specifications of interest, and by calculating a correspondence rate for each matching specification of interest.

Said merchant servers may have catalogue databases holding information on trade items for which MerchantAssists, associated with said merchant servers, carry specifications of interest, and may access said catalogue databases to obtain information to facilitate calculation of said correspondence rate.

Said merchant interest database may only holding data relating to product categories and key attributes for a trade item for which MerchantAssists carry specifications of interest.

Data relating to a trade items may be partitioned between mandatory parameters and optional parameters, and said mandatory parameters may include an indication of whether a specification of interest relates to a desire to purchase, or sell, and a product category.

A correspondence rate, Corr_level, between two statements of interest may be calculated using the following algorithm:

Corr_level = 1 -(SUM(OP(X)*F(X)))/X

Where:

N = Number of optional parameters in one of said statements of interest

OP(X) = an optional parameter and X has a value between 1 and N, each

optional parameter having a value of 1 in the vector

F(X) = a priority weighting factor.

On delivery, by a WebButler, of a first specification of interest to said search engine with a request to identify corresponding specifications of interest, said search engine may search said user interest database and said MerchantAssist database and identify specifications of interest for which all mandatory parameters match said first specification of interest and may deliver to said WebButler a list of originators for matching specifications of interest.

Logic for collecting data required for calculation of correspondence rates from merchant servers may be assigned to WebButlers.

Said list of originators may be presented to a user as soon as it is available, together with a counter indicating progress toward obtaining additional data needed to calculate correspondence rates, and said WebButler may calculate said correspondence rates and cause said list to be updated as and when said correspondence rates are calculated, said updated list being prioritised and including correspondence rates.

Data carried by WebButlers and MerchantAssists may be dynamically synchronised with data held by said search engine.

The following messages may be exchanged between WebButlers and said search engine, and between MerchantAssists and said search engine:

- "Submit Interest";
- "Update of Interest Profile"; and
- "Reference to Agents with Corresponding Interests".

in order to achieve said dynamic synchronisation.

Said search engine may provide value added services including:

- marketing statistics;
- reports on specifications of interest;
- information brokerage; and
- advertising.

Specifications of interest may be created with a dynamic editor adapted to request additional information from a user.

Specifications of interest may be converted from a merchant's format to a format used by said search engine.

Said merchant interest database and said user interest database may be country, or region, specific.

Said service provider server may have a database containing a black list of product categories which are non-approved for a specific country, or region, and every new product and/or product attribute may be compared with said black list and, if a correspondence is found, may reject said new product and/or product attribute.

According to a fourth aspect of the present invention, there is provided a search engine for use with a telecommunications transmission system, as set forth in any preceding paragraph, characterised in that said search engine is resident on a service provider server and adapted to receive search instructions from WebButlers and MerchantAssists, to conduct searches on at least two databases, and to access remote databases for additional data.

Embodiments of the invention will now be described, by way of example,

with reference to the accompanying drawings and table, in which:

Figure 1 illustrates, in schematic form, the relationships between some of the basic functions and services that are employed in the AMP electronic platform.

Figure 2 illustrates the layer model used by the AMP service platform.

Figure 3 illustrates the operation of a translation agent that translates between different agent protocols and to, or from, traditional http-based web sites.

Figure 4 illustrates the use of the Telia WebButler graphical interface to monitor and control a personal agent.

Figure 5 shows the software modules used in the Telia WebButler.

Figure 6 illustrates the high level interaction between a WebButler and an AgentFind server, and between a MerchantAssist and an AgentFind server.

Figure 7 illustrates an example of the way in which information is presented to a user by his WebButler.

Figure 8 illustrates the way in which information is distributed between the different elements of AgentFind.

Table 1 shows the message/event types for an agent-based Auctioneer Service.

To fully appreciate the present invention, it is necessary to consider the operation of AMP. Figure 1 illustrates, in the form of a block diagram, a high-level overview of the relationships between some basic functions and products used in the AMP agent-based electronic commerce platform.

The some of the principle features of AMP which are not present in known products and services, based on agent orientated architectures, are set out below:

(a) AMP enables peer-to-peer autonomous communication between agents on the Internet. These can be agents representing users wanting to buy and/or sell goods and services, merchants, brokers, etc.. This approach has the advantage that any agent can initiate a communication with other agents, computer programs, at any time. The agents can understand the information they receive and take action autonomously. They can, therefore, fulfill complex requests from their owner. The disadvantage is that additional data has to be created to support machine-to-machine communication because, at the present time, the web is structured to support man-machine and not machine-machine communication.

(b) Because the agents can manage the interest descriptions of their owners, AMP facilitates the achievement of more powerful, realtime relationship marketing when the owner visits e-commerce stores on the web. It is also enables the merchant to develop a relationship with the owner/owners agent after that agent has visited his/her store.

(c) Based on its ability to support machine-to-machine communication, AMP makes it possible for users to specify, in a user-friendly manner, trigger-points when the user would like to come into the loop while the agent is working on a task. That could, for example, be when it is necessary to give an offer over a specified limit in a buying negotiation for a requested item.

(d) AMP gives the user a useful tool to facilitate obtaining status information about the different tasks the user's agent is working on. This, of course, also includes the capability to:

- If desired, manually take-over control of different tasks from the agent; and

- change trigger-points and other important parameters, etc..

(e) Since the agent, in AMP, is executing on a network operator's servers, for example, Telia's servers in their telecommunications network, the user can access the agent through any device, for example, a home computer, a computer at the user's place of work, a mobile PDA, and may even obtain notifications through pagers, GSM/SMS, etc.. This gives the user the additional benefit that he/she doesn't need to be connected on-line when the agent is working on the requested task while still giving the agent the ability to urgently notify the user, as and when required, through the user's preferred telecommunication service.

(f) Co-operation between agents, based on different technical platforms, is also achieved.

(g) Agents can interface services, such as reputation services, payment services, logistic services, etc..

(h) AMP supports e-mail communications which makes it possible to communicate through firewalls. This also creates a more easily used interface to EDI applications.

The forgoing mechanisms open-up new possibilities for electronic commerce in the consumer-to-consumer, the business-to-consumer, as well as, the business-to-business marketplace.

The Agent-based Market Place (AMP) introduces a new paradigm for the Internet which, in turn, opens up new possibilities for network operators, such as Telia, and their business customers, partners and consumers. In 1998, Telia developed a Market Space prototype, in co-operation with the Swedish Institute of Computer Science (STCS) and the Uppsala University, which implemented basic protocols and mechanisms for an AMP. The technical and commercial opportunities for AMP were successfully demonstrated by using the Market Space

prototype in an electronic auction application.

An Agent-based Electronic Commerce Service Platform supports Agent Applications with necessary mechanisms making it fast and easy to implement new types of agent functionality/behaviour for electronic commerce. In order to achieve flexibility, a layered architecture, such as the layered model of an Agent-based Service Platform diagrammatically illustrated, in the form of a block diagram, in Figure 2 of the accompanying drawings can be used. As illustrated in Figure 2, the different layers of the model are as follows:

(1) Agent Specific Layer:

Where different behaviour/functionality for agent applications are implemented. Typical examples are Telia WebButler, Telia InfoBroker, Telia MerchantAssist, Telia AgentFind, Telia Archive, and Telia Auction.

(2) Information Layer:

Translation from internal representation to the Agent Communication Protocol used between Agents. Could, for example, be KQML or something similar.

(3) Interaction Layer:

Creation/Parsing of messages (see Figure 2).

(4) Message Transfer Layer:

Managing the physical Internet transfer of messages utilizing mechanisms like sockets, for example.

The Agent-based Market Place (AMP) Service Platform focuses on supporting electronic commerce applications. Figure 3 shows examples of messages managed in the Interaction Layer of Figure 2 for an auctioneer

application. Other messages/event types can be created, if needed, for other applications, such as, index service, credit reporting service etc..

Another important aspect is that not all agents on the Internet will be based on this platform. It is, therefore, necessary to support an application that translates between different agent types. That service is also important when the agent applications access information based on traditional http format. Figure 4 of the accompanying drawings diagrammatically illustrates, in the form of a block diagram, the general layered architecture for this translation agent.

A new type of index service, provided by Telia, which has similarities with the search engines on the web is called AgentFind. The role of AgentFind is to inform agents/WebButlers about other agents/WebButlers having corresponding interest profiles, in order to make it possible for those agents to find each other. An important difference between AMPS and HTTP-based search engines is that this database will change much more rapidly. It is, therefore, necessary to implement mechanisms in the ACP (Agent Communication Protocol) that support consistency management between the AgentFind database and the interests stored at the users WebButlers. Another key issue is the rating mechanism related to the level of conformity between the interest specifications of different WebButlers. This mechanism has, for example, to take into consideration if specific parameters have been specified as mandatory, or optional.

Dual Session Identification is a mechanism which makes it possible to synchronize a real-time session for a user on a commercial Web-site with the dialogue between the user's WebButler and the commercial Web-site's corresponding MerchantAssist functionality. This makes it possible to create personalized real-time promotions etc. based on a user's actual interest profile.

Market Integration Agent ACP-HTTP is a mechanism which makes it possible for WebButler and other agents to utilize ordinary http-based information from conventional web-sites.

Market Integration Agent AMP/ACP to other ACP is a mechanism which

makes it possible for agents based on different technical platforms to communicate with each other.

Agent-based Payment Manager/Adaptor implements the functionality needed for managing payments from autonomous agents. The Payment Manager mechanisms utilize basic payment mechanisms provided by, for example, SEMPER.

Architecture for Agent-based Electronic Commerce Service Platform - this is the technical architecture the AMP services are built upon, consists of an agent specific layer, an information layer, an interaction layer and a message transfer layer.

The Agent-based Market Place (AMP) services are as follows:

(A) Telia WebButler:

- Negotiate and Auction;
- Interest editor for contracts;
- Trigger-point editor and priority;
- Accessability and Notification;
- Notification Calender;
- Personal profile (address, interest, demography);
- Plug-in's for different behaviour missions;
- Message Box;
- Advertisement Box;

- Bookmarks to other agents;
- Secure identification when accessing the personal WebButler;
- Identification during signing of contracts (CA, dig. signature, ...);
- Restriction mechanisms (inherit from parent to child, ...);
- Electronic wallet; and
- GUI.

(B) Telia InfoBroker:

- Telia AgentFind (index service that links together agents with similar interests);
- Telia Archive for signed contracts;
- Distribution of personal advertisements;
- Statistics of requested interests; and
- Interface to Pay Service.

(C) Telia MerchantAssist:

- Personal Advertisement Management;
- Relationship advertisement and dynamic WWW-promotion related to individual users unique interests;
- Loyalty programs;

- Interface to Telia Pay;
- Interface to Telia Distribute; and
- Statistics over consumer profiles.

The Telia WebButler Service has a user friendly interface through which the user can interact with agent-based and conventional WWW-based services on the Internet. The service is used through a separate window on the user's computer (see Figure 5 of the accompanying drawings). This means that the Telia WebButler can co-operate with other services that the user accesses through TCP/IP, for example, through his/her conventional web-browser (Netscape, Explorer, etc.). It is, however, possible for the Telia WebButler to operate when the owner is disconnected from the network through e-mail EDI messages etc..

The benefit of WebButler is that the agent at the user's server and the agent at the visited web-site can communicate interests and transfer basic data between each other. The result is that there is no need for the person concerned to manually type-in requested information at the site. An even larger benefit for the user is that the site knows about the user's interest. This means that the user will be presented with, for him/her, valuable information directly by the site instead of receiving the standard information that all users receive. This is not only an advantage for the user, since commercial web-sites can use this information for relationship marketing, so that this information is valuable for both parties.

Figure 5 of the accompany drawings diagrammatically illustrates a User Client Computer and a Merchant's Commercial Web Server. The user can monitor and control his/her personal agent through a separate Telia WebButler Graphical User Interface on the screen. The primary purpose of the Telia WebButler service is, however, to control and monitor a personal agent which operates on a net-based server. This means that the user can initiate processes for the agent through any suitable device available at the time, for example, a

home computer, a computer at his/her place of work, a mobile PDA with a cellular connection to the Internet, etc.. This, for example, enables the user to specify a negotiation strategy for the agent, trigger-points when the user will be informed/involved in further decisions etc., and to order the agent to begin the negotiation/bidding. The user can then disconnect himself/herself from the network and the agent will continue the task it is executing on a server, for example, Telia's server, in the network.

When a trigger-point is reached, the agent informs the user by means of the requested media. This could be through a message on the Telia WebButler, for example, complemented with a message on the user's pager, GSM/SMS etc., if the user has identified the trigger-point as urgent. The user can then access his WebButler through any available suitable device, to analyze the received information and give the agent further directions. The user can of course also elect to finish the bidding etc., manually, after the agent has completed the routine work necessary to reach this important point in the process.

Figure 6 diagrammatically illustrates the different software modules in the Agent Specific layer implementing, in this case, the WebButler.

The User Interface of Figure 6 implements a user friendly window on the users screen. It is based on easily understandable icons for processes and events. When the user clicks on the icons, he/she receives more detailed information on current status, collected information etc.. The user can, in addition, easily control the agent's action by specifying trigger-points etc..

The Interaction Plug-Ins of Figure 6 implement the User Interface to different, or improved, agent applications/behaviour. For example, an agent specialized for electronic auctions (negotiation, strategy, etc.) may include an interface towards index agents necessary to obtain information concerning the location of interesting auctions which include specified items, credit reporting service making sure that the auctioneer's operation is run by a solid company etc.. The Interaction Plug-Ins, therefore, provide basic mechanisms for different kinds of applications/ behaviour.

The Session Manager of Figure 6 implements the management of the processes necessary to perform the requested tasks. This includes creation of the messages necessary to perform the task, interpretation of received messages, halting the process and notifying the owner of the agent if a trigger-point has been met etc.. The logic necessary to perform the requested tasks is, therefore, implemented in the Session Manager module.

The Database of Figure 6 manages all data necessary for operating the Personal Agent Service. This includes specifications of the owner's interests upon which the requested missions are based, messages received and transmitted, status information on the sessions, locally stored addresses to agents/agent sites which have worked well during earlier missions etc.. The database also stores the requested information which the agent collects through the mission in order to be able to present it to the owner as, and when, requested.

The Telia MerchantAssist includes the necessary functionality for providing realtime personalized promotions to visitors to commercial web sites. The mechanisms also support real-time marketing to consumers after a visit to the store.

The Telia InfoBroker Service includes Telia AgentFind, Telia Archive and Telia Auction. Telia MerchantAssist will have an interface to Telia Pay and Telia Distribute.

The InfoBroker Service sells:

- advertisement distribution to interested companies - the advertisements are attached to the WebButler's Ad-Box when requests are made from AgentFind; and

- market statistics collected by AgentFind when requests are made - this makes it possible for companies to identify product areas frequently requested by WebButlers and to compare the market's

ability to satisfy the demand.

Telia Archive stores electronic contracts. Telia Distribute integrates necessary functionality for the delivery services.

The agent based electronic market place to which the present invention relates is based on decentralized services with enhanced value for both the end users and merchants. The basic services are Telia WebButler, Telia AgentFind and Telia MerchantAssist.

This approach requires users to specify purchase requests, or offers for sale, i.e. buy interests, or sell interests, once and once only. It is then possible to visit any merchant supporting the MerchantAssist service to get personal promotions based on the user's unique interests without the need to answer any questions etc., on the merchants web site, since both WebButlers and MerchantAssists submit their buy/sell interests to the AgentFind service. Thus, it is the AgentFind service that helps the user to find which merchants to visit on the web, based on the user's specified interests.

It is also possible for users to contact each other directly through the AgentFind service. AgentFind matches users interests and helps the users' WebButlers to find other WebButlers with matching interests.

The core of AMP is the three services Telia WebButler, Telia AgentFind and Telia MerchantAssist.

Telia Web Butler is an efficient and convenient tool for end users when selling, or buying, items on the web.

Telia MerchantAssist is the Merchant's tool that makes it possible to provide individual promotions based on a users specific interests at the time they visit the merchants web store.

AgentFind is a necessary service for both WebButler and MerchantAssist

which facilitates the connection of buyers to sellers. AgentFind acts as a WebBroker, providing an opportunity for Merchants to expose advertisements, to the owner of a WebButler, which relate to the interests submitted to AgentFind.

All three services are, however, necessary in order for the Agentbased Marketplace to work.

The core of the WebButler is the interest editor. This is a dynamic editor based on an inf, relevant questions will be presented on the screen requesting mandatory, or optional, parameters specifying the item. This functionality makes it possible for users to specify items for purchase, or sale. An advantage with this, for the user, is that he/she doesn't need to browse the net forever in order to find sellers/buyers for the specified trade item. Instead, the user finds other users and/or commercial companies with corresponding interests through the AgentFind service. When the user visits an electronic store on the web, he/she will get promotions automatically for the items specified and doesn't need to waste valuable time to find those items in the merchants store.

The trigger point editor gives the user the ability to specify how far the WebButler will be allowed to act autonomously and when autonomous execution must cease and the control be returned to the user in order to decide how to proceed.

The user may be informed through the WebButler interface or, alternatively, the user may specify other means of notification for urgent trigger points. This could include, for example, notification through pagers, GSM SPS messages etc.

The MessageBox is the area in the WebButler user interface where information is displayed about ongoing missions.

The Advertisement Box is the area in the WebButler user interface where advertisements/banners are displayed. This is a display area on the WebButler that the WebButler operator has an exclusive right to use, similar to the Banner

area on search engines like Altavista. The AdBox is filled with new advertisements when the WebButler has accessed the AgentFind Service. The advertisements are related to the specified interests, stored in the WebButler, when accessing AgentFind.

The personal profile provides the possibility for users to store information about name, address, phone/fax numbers, demographic data, long term interests etc. The user can protect this information, when needed, by clickr parts of it, is accessible for merchants and other users of WebButlers. This has the advantage that users don't have to type in all their personal information when purchasing an item. The user will also get a more personalized treatment when visiting merchants stores.

The Book-Marks to other Agents function makes it possible for WebButlers to store addresses to favourite agents, or other WebButlers, or MerchantAssists, which have been received earlier from AgentFind.

The negotiate functionality makes it possible for Web Butlers and MerchantAssists to negotiate during the purchasing phase of an item. If several participants are involved, the negotiation turns into an electronic auction. Users can select different negotiation strategies, based on their own preferences. It is, therefore, impossible for an individual participant to know the outcome of such a negotiation.

Use of a Plug-in API makes it possible for third party vendors to add sell software for users WebButlers giving them enhanced behaviour and/or functionality. This could include, for example, more powerful negotiation algorithms, functionality for a competence broker etc. Providing this open interface ensures a fast growing penetration for WebButlers.

Identification may be performed by the use of passwords. However, when negotiation, electronic contracts etc. are deployed, it is necessary to have a more secure identification of users. This can be achieved by the use of smart card identification with certification of authority functionality.

In order to make the purchasing phase more efficient, functionality for supporting electronic contracts can be provided.

In order to make the payment phase efficient, functionality for supporting different electronic payment mechanisms can be supported as well as electronic wallets for management of the different means of electronic payment, receipt etc.

Functionality can be provided to make it possible to restrict the usage of WebButlers. This is done by using inheritance mechanisms where a "parent" WebButler can restrict the functionality of "child" WebButlers. For consumers, it could, for example, be that the children in a household will only be able to purchase items that are not related to violence, pornography etc. In a business environment, it could be, for example, that employees can only purchase items related to the company's operations.

The primary function of Telia AgentFind is to match sell/buy interests. This is done by managing a database with specified sell/buy interests together with the address to the WebButler, or MerchantAssist, that submitted the interest.

When a WebButler, consumer's agent, or MerchantAssist, merchant's agent, submits an interest specification, it will receive information about WebButlers and MerchantAssists with corresponding interests. For each corresponding intl be received. Based on this information, the WebButlers, or MerchantAssists, can access the other agents with the closest corresponding interests.

Consumers and Merchants can file specified interests with the AgentFind Service. Consumer A can thus determine that Merchant 1 has a corresponding interest and Consumer D determines that Merchant 3 has the best match for his/her interests. Consumer B, on the other hand, may find that Consumer C is the best person to contact with regard to his/her specific interests.

The major revenue from the AgentFind Service will probably be made from

information brokerage. That is the sale of exposure of advertisements/banners on users WebButlers, based on the specific interests submitted to AgentFind. This is achieved by using the AdBox facility on the WebButler for which AgentFind has exclusive access for advertising promotions.

Another source of revenue for AgentFind is the sale of market statistics. That is information regarding the volume and profile of submitted interests. This information is very valuable for merchants, since it enables them to detect mismatches between market demand for specific products and what is currently on offer. This information can for example be used when a merchant would like to expand sales into new product areas etc.

Telia MerchantAssist provides Merchants with the opportunity to provide individual promotions when users visit the Merchants Web Store. This is done by synchronizing the users specified interests with the items provided by the electronic stores. If the store has matching items, specific individualised promotions can be provided for the specific customer. The potential can be even greater if the store also matches the interests with the users previous purchases in the store, which are stored in the Customer Database. It is then possible to know if the consumer is an important customer who should receive special treatment.

The MerchantAssist Service ma-line" promotions for the consumer based on the consumer's specified interests which are valid when the store was visited.

As explained above, the Telia agent based marketplace provides users with a personal software agent, called a WebButler. The WebButler provides support for the user and enables him/her to specify the particular buy, or sell, contracts in which he/she is interested. Commercial Merchants can also specify items for sale, in electronic stores, through a MerchantAssist function.

The main task of the AgentFind Service is to provide WebButlers and MerchantAssists with information on which other agents (WebButler and MerchantAssists) have corresponding interests. This makes the AgentFind service the natural hub of the agentbased marketplace. In addition to its base

function, i.e. to match corresponding interests between agents, AgentFind also provides value added services, such as marketing statistics, information on requested interests, information brokerage & advertisement services etc..

Because the interests of each WebButler frequently change, it is essential that the AgentFind database is continuously updated. Automatic coordination mechanisms are, therefore, needed.

One challenge the system must meet is the provision of correct ratings for the level of correspondence between matching interests since it is rare that the interests correspond exactly. Based on the rating, agents (WebButler, or MerchantAssist) can automatically prioritise which of the other agents (WebButler, or MerchantAssist) should be contacted.

Operation of AgentFind is critically dependent on the information structure employed to express users and merchants buying and selling interests. These interests are created by using a dynamic editor which can request additional information based on the trade object that is specified. This makes it convenient for the users to provide meaningful information regarding a specific trade object.

The parametersptional.

The WebButler and the MerchantAssist software include a synchronization mechanism for data replication between themselves and AgentFind. This ensures that the stored interests in AgentFind are always updated. If any specified interest is deleted, or modified, the synchronization is made through an "Update of interest profile" message. This ensures that other WebButlers and MerchantAssists will not receive a recommendation from AgentFind to contact an agent for which the requested interest has been deleted, or modified, in such a way that the interests no longer correspond with each other.

If a new interest is specified, AgentFind is updated through a "Submit interests" message.

The message structure, described above, is illustrated in Figure 7 which clearly shows the relationship between a WebButler, a MerchantAssist and AgentFind. The WebButler carries the specified interest of an end user which has been created by the end user using a dynamic interest editor. The MerchantAssist carries specifications of items for sale. The description of items and their prices can be changed by a merchant using a dynamic editor, or other suitable mechanism. AgentFind has a database which stores consistently updated interest specifications submitted by end users through WebButlers and by merchants through MerchantAssists. The message structure operating between WebButlers and AgentFind, and between MerchantAssists and AgentFind is intended to ensure that the data carried by these entities is in agreement, i.e. correlated. As described above, the following messages are used:

- "Submit Interests";
- "Reference to Agents with Corresponding Interests"; and
- "Update of Interest Profile".

The function of these messages is self explanatory.

If a new interest has been specified, or an interest has been updated, the "Reference to Agents with Corresponding Interest" message is received. It includes a prioritised list of agents with corresponding interests that could look like the example illustrated in Figure 8, where a WebButler is interested in buying a Bianchi bicycle. The rating gives a measure of the correspondence between the trade object offered for sale and the specification of interest by a potential purchaser, in this case: "A Bianchi Bicycle having at least 21 gears which is not more than 2 years old, costs less than $300 and is preferably green, or blue".

An essential requirement for finding correspondence between a trade object and a specification of interest, that must be met before making a correspondence rating between the trade object and specification of interest, is that all mandatory parameters must match. That is to say, that the trade object

and specification of interest must relate to the same product category and must have the same attributes marked as mandatory. This is important in order to secure short response times for requests to AgentFind.

The level of correspondence is calculated using the following algorithm;

Corr_level = 1 - (SUM(OP(X)*F(x)))/X

Where:

N = Number of optional parameters in the request

OP(X) = Optional parameter. A vector where X has value from 1 to N. Each optional parameter has value 1 in the vector.

F(X) = Priority weight factor for each optional parameter. A vector where X has value from 1 to N. Each element (priority weight factor) in the vector has a possible value between 0 and 1. (It is of course possible for the user to select the default value 1 for all weight factors if he/she feels that all optional parameters are of equal value).

The parameters for the correspondence calculation are defined by the user using his/her WebButler. This makes it possible for users themselves, or through additional computer programs, PlugIns, connected through the WebButler API, to modify the parameters in order to get a rating result that best suits the individual user and/or application.

When a user specifies his/her interest through his/her WebButler, he/she selects which parameters are mandatory and which are optional. The top level parameters are always mandatory i.e. whether a transaction is a purchase, or sale, and the product category - a bicycle in the case of the example illustrated in Figure 8.

In order to minimize:

- the storage space needed in the AgentFind database; and
- the response time for requests;

an information hierarchy is employed.

Figure 9 shows an overview of the information stored in the Telia server domain and in the Merchant server. In particular, Figure 9 shows the way in which interest data is partitioned between the various elements of AgentFind in Telia's server and a merchant's database. It should be noted that the WebButler, Logic for AgentFind and the MerchantAssist software, in the Telia domain, can be allocated to independent servers. All user specified interests are stored in the User Interest Database, on Telia's server. Only the product category and the key attributes for each trade item that a merchant wishes to offer for sale are stored in the MerchantAssist Database (MA-DB), on Telia's server. These include, for example, attributes such as whether a trade object is offered for sale, or sought for purchase, and geographical location. All other data for the item is stored in the Catalog-DB database on the merchants server. It should be noted that AD.DB is a database of advertising material.

The use of this architecture, or information hierarchy, makes it possible to reduce the number of merchants, having trade items matching a particular interest specification, to a small number, when a request is received by AgentFind, in Telia's Server. In order to calculate the level of interest correspondence, i.e. rating, requests are sent from the WebButler to the merchant's server, in order to collect the additional attributes needed. When the calculation has been completed, a final answer including references and rating is returned to the user.

When the volume of users and/or merchants and purchase requests and/or sale offers is limited, most of the merchant's product information can be stored locally, at the merchant's sites. When the number of users and/or merchants increases and, the number of trade items each merchant offers for sale also increases, it is necessary to increase the number of parameters stored in

Telia's Merchant Database. This is necessary in order to reduce the number of requests sent to merchants asking for more information, thus preventing, the merchant servers from becoming congested and ensuring that the overall response time for a request to the AgentFind index service does not become excessively long.

In order to reduce the load of the AgentFind service, the logic for collecting additional information needed for the rating calculation from merchant servers is allocated to the WebButler.

Since the volume of data stored, from consumer purchase requests and offers of sale is low, all this information can be stored directly in Telia's, or another operators, server.

In order that the user should have a fast response time, an unprioritised list of correlated agents is displayed as soon as AgentFind has made a pre-selection of agents, based on the product categories and key attributes stored in AgentFind. A counter then shows the progress of the rating process. Since this second phase includes information collection from merchant servers, it can take a considerably longer time to perform. When the data collection is completed, the calculation of rating level is performed locally in the WebButler and presented to the user.

The MerchantAssist software stored on the merchant's server includes a conversion function. This function converts, when necessary, product data information to the information structure used by AgentFind. It could be, for example, that AgentFind has a set of accepted product classes and attributes for each product class. If the merchant has a more detailed classification of products/attributes, a transformation is performed to convert the merchant's detailed classification to that accepted by AgentFind. A user friendly interface is provided to make it easy for merchants to specify these cross-reference tables.

Because of differences between the laws and ethical norms between countries, it is possible to create local AgentFind databases for a specific country,

or a cluster of countries, when appropriate. It is then possible to automatically remove product categories and attributes not permitted by law or ethics, in a particularly country, or region. This is done by generating a "black" list where non-approved product categories and/or attributes are stored. An automated check with the black list is performed for every new product category/attribute. If a new product category and/or attribute is found on the list, the product category and/or attribute is automatically rejected.

By using the WebButler interface, a user can create a new specification of interest, or edit a purchase request, or sale offer, which has already been submitted to the AgentFind Index Service. When the request is submitted, the user's WebButler will receive information regarding other WebButlers and merchants with correlated interests. As long as the user lets AgentFind store a submitted interest, other users, WebButlers, or merchants, will be notified of the user, if, and/or when, they submit a corresponding interest specification.

When the user edits an interest that has already been submitted to AgentFind, it can be stored locally, if the user doesn't want the new version to be effective on the net. If, however, the user selects the submit, or publish, function, after the editing session, the new version will replace the old one in the AgentFind server. A response will then be received, identifying other users, WebButlers and Merchants with matching interests.

If a user does not wish other users, e.g. WebButlers, or merchants, to be able to identify him/her and connect to him/her, it is possible to submit a purchase request, or sale offer to AgentFind with the storage parameter disconnected - this is done in the WebButler user interface. The user then receives the same response from AgentFind as when a purchase request, or sale offer is submitted with the storage parameter enabled. That is to say, a list of users, WebButlers and merchants with corresponding interests including a rating of the correspondence. It will, however, not be possible for other WebButlers and Merchants to submit interests to AgentFind and get a reference to this user, or WebButler, based on the submitted interest, since it is not stored.

As herein used, the terms WebButler and MerchantAssist are intended to refer to agents associated with end users, or consumers, and merchants respectively, and should not be interpreted as carrying any connotation limiting them to a particular service provider, such as Telia.

RECEIVED MESSAGE EVENT	BEHAVIOUR OF AUCTIONEER
Ask (A, Auct, EOI)	A buy/sell request to A with a specification of the item/interest
Tell (A, Auct, EOI)	A proposal from A to buy/sell with a specification of the item/interest
Negotiate (A, Auct, EOI)	If EOI (Expression Of Interest) indicates that A is interested in buying what the Auct (Auctioneer) is selling, the last offer is sent to A in an Offer message. If there is no offer, the initial request is sent to A in a Negotiate message. A is then a participant in the auction and will receive information about given offers from other participants.
Offer(A, Auct, EOI)	If EOI corresponds to a new highest offer for the item on sale, this offer is distributed in Offer messages to all participants in the auction. In another case, the highest offer is sent back to A. If this was the first offer from A, A is included as a member in the auction. (The Offer message is legally binding, which is not the case for the negotiate message)
Accept (A, Auct)	A is informed by the auctioneer that his/her offer is accepted and the auction of the item is finished.
Decline (A, Auct)	If this message is sent from the Auctioneer, A is informed that the auction is finished and that somebody else purchased the item. If the same message is sent from A, the Auctioneer is informed that A is no longer interested in participating in the auction. A will not receive new offers.
Timeout (time)	The auction expires when the timeout message is received. The auction could either be operated during a specified time period, or the auction could end when the time period between two offers is longer than a specified time interval.

TABLE1

CLAIMS

1. A telecommunications transmission system adapted to operate as a platform for an agent-based electronic market and including a plurality of end user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of merchant servers, said platform being arranged to support agent-based market interactions between a plurality of agent types, characterised in that:

- said at least one service provider server has logic means for implementing a search engine adapted to interact with WebButlers, MerchantAssists, a user interest data base and a merchant interest database;

- said WebButlers and MerchantAssists are adapted to carry specifications of interest in trade items,

- said search engine is adapted, on request by a first agent having associated therewith a first specification of interest, to identify specifications of interest associated with other agents, which match said first specification of interest, by searching said user interest data base and MerchantAssist database; and

- there are provided means to calculate a correspondence rate for each extracted specification of interest.

2. A telecommunications transmission system, as claimed in claim 1, characterised in that said merchant servers have catalogue databases holding information on trade items for which MerchantAssists, associated with said merchant servers carry specifications of interest, and in that said means to calculate is adapted to access said catalogue databases to obtain information to facilitate calculation of said correspondence rate.

3. A telecommunications transmission system, as claimed in claim 2, characterised in that said merchant interest database only holds data relating to product categories and key attributes for trade items for which MerchantAssists carry specifications of interest.

4. A telecommunications transmission system, as claimed in claim 3, characterised in that data relating to a trade items is partitioned between mandatory parameters and optional parameters, and in that said mandatory parameters include an indication of whether a specification of interest relates to a desire to purchase, or sell, and a product category.

5. A telecommunications transmission system, as claimed in any of claims 2 to 4, characterised in that said means to calculate is adapted to calculate a correspondence rate, Corr_level, between two statements of interest using the following algorithm:

Corr_level = 1 -(SUM(OP(X)*F(X)))/X

Where:

N = Number of optional parameters in one of said statements of interest

OP(X) = an optional parameter and X has a value between 1 and N, each optional parameter having a value of 1 in the vector

F(X) = a priority weighting factor.

6. A telecommunications transmission system, as claimed in either claim 4, or claim 5, characterised in that, on delivery, by a WebButler, of a first specification of interest to said search engine with a request to identify corresponding specifications of interest, said search engine searches said user interest database and said MerchantAssist database and identifies specifications of interest for which all mandatory parameters match said first specification of interest and in that a list of originators for matching specifications of interest are delivered to said WebButler.

7. A telecommunications transmission system, as claimed in claim 6, characterised in that logic for collecting data required for calculation of correspondence rates from merchant servers is assigned to WebButlers.

8. A telecommunications transmission system, as claimed in claim 7, characterised in that said list of originators is presented to a user as soon as it is available, together with a counter indicating progress toward obtaining additional data needed to calculate correspondence rates, and in that said WebButler calculates said correspondence rates and causes said list to be updated as and when said correspondence rates are calculated, said updated list being prioritised and including correspondence rates.

9. A telecommunications transmission system, as claimed in any previous claim, characterised in that data carried by WebButlers and MerchantAssists is dynamically synchronised with data held by said search engine.

10. A telecommunications transmission system, as claimed in claim 9, characterised in that said dynamic synchronisation is achieved by exchanging the following messages between WebButlers and said search engine, and between MerchantAssists and said search engine:

- "Submit Interest";
- "Update of Interest Profile"; and
- "Reference to Agents with Corresponding Interests".

11. A telecommunications transmission system, as claimed in any previous claim, characterised in that logic and software, associated with WebButlers, MerchantAssists and said search engine, resident on said service provider server, is allocated to different servers in said service provider's domain.

12. A telecommunications transmission system, as claimed in any previous

claim, characterised in that said search engine is adapted to provide value added services including:

- marketing statistics;
- reports on specifications of interest;
- information brokerage; and
- advertising.

13. A telecommunications transmission system, as claimed in any previous claim, characterised in that specifications of interest are created by using a dynamic editor adapted to request additional information from a user.

14. A telecommunications transmission system, as claimed in any previous claim, characterised in that said merchant servers include conversion means adapted to convert specifications of interest from a merchant's format to a format used by said search engine.

15. A telecommunications transmission system, as claimed in any previous claim, characterised in that said merchant interest database and said user interest database are country, or region, specific.

16. A telecommunications transmission system, as claimed in claim 15, characterised in that said service provider server has a database containing a black list of product categories which are non-approved for a specific country, or region, and in that every new product and/or product attribute is compared with said black list and, if a correspondence is found, is rejected by said service provider server.

17. A telecommunications transmission system, as claimed in any previous claim, characterised in that said service provider server is adapted to receive specifications of interest with a storage parameter disconnected so that said

specifications of interest are not stored on said user interest database.

18. A service provider server adapted to operate with a telecommunications transmission system, as claimed in any of claims 1 to 17, characterised in that:

- said service provider server has logic means for implementing a search engine adapted to interact with WebButlers, MerchantAssists, a user interest data base and a merchant interest database;
- said service provider server has resident thereon software associated with said WebButlers and MerchantAssists;
- said WebButlers and MerchantAssists are adapted to carry specifications of interest in trade items;
- said search engine is adapted, on request by a first agent having associated therewith a first specification of interest, to identify specifications of interest associated with other agents, which match said first specification of interest, by searching said user interest data base and MerchantAssist database;
- there are provided means to calculate a correspondence rate for each extracted specification of interest.

19. A service provider server, as claimed in claim 18, characterised in that said merchant servers have catalogue databases holding information on trade items for which MerchantAssists, associated with said merchant servers, carry specifications of interest, and in that said means to calculate is adapted to access said catalogue databases to obtain information to facilitate calculation of said correspondence rate.

20. A service provider server, as claimed in claim 19, characterised in that said merchant interest database only holds data relating to product categories and key

attributes for trade items for which MerchantAssists carry specifications of interest.

21. A service provider server, as claimed in claim 20, characterised in that data relating to a trade items is partitioned between mandatory parameters and optional parameters, and in that said mandatory parameters include an indication of whether a specification of interest relates to a desire to purchase, or sell, and a product category.

22. A service provider server, as claimed in any of claims 19 to 21, characterised in that said means to calculate is adapted to calculate a correspondence rate, Corr_level, between two statements of interest using the following algorithm:

Corr_level = 1 -(SUM(OP(X)*F(X)))/X

Where:

N = Number of optional parameters in one of said statements of interest

OP(X) = an optional parameter and X has a value between 1 and N, each optional parameter having a value of 1 in the vector

F(X) = a priority weighting factor.

23. A service provider server, as claimed in either claim 21, or claim 22, characterised in that, on delivery, by a WebButler, of a first specification of interest to said search engine with a request to identify corresponding specifications of interest, said search engine searches said user interest database and said MerchantAssist database and identifies specifications of interest for which all mandatory parameters match said first specification of interest and in that a list of originators for matching specifications of interest are delivered to said WebButler.

24. A service provider server, as claimed in claim 23, characterised in that logic for collecting data required for calculation of correspondence rates from merchant servers is assigned to WebButlers.

25. A service provider server, as claimed in any of claims 18 to 24, characterised in that data carried by WebButlers and MerchantAssists is dynamically synchronised with data held by said search engine.

26. A service provider server, as claimed in claim 25, characterised in that said dynamic synchronisation is achieved by exchanging the following messages between WebButlers and said search engine, and between MerchantAssists and said search engine:

- "Submit Interest";
- "Update of Interest Profile"; and
- "Reference to Agents with Corresponding Interests".

27. A service provider server, as claimed in any of claims 18 to 26, characterised in that logic and software, associated with WebButlers, MerchantAssists and said search engine, resident on said service provider server, is allocated to different servers in said service provider's domain.

28. A service provider server, as claimed in any of claims 18 to 27, characterised in that said search engine is adapted to provide value added services including:

- marketing statistics;
- reports on specifications of interest;
- information brokerage; and
- advertising.

29. A service provider server, as claimed in any of claims 18 to 28,

characterised in that said merchant servers include conversion means adapted to convert specifications of interest from a merchant's format to a format used by said search engine.

30. A service provider server, as claimed in any of claims 18 29, characterised in that said merchant interest database and said user interest database are country, or region, specific.

31. A service provider server, as claimed in claim 30, characterised in that said service provider server has a database containing a black list of product categories which are non-approved for a specific country, or region, and in that every new product and/or product attribute is compared with said black list and, if a correspondence is found, is rejected by said service provider server.

32. A service provider server, as claimed in any of claims 18 to 31, characterised in that said service provider server is adapted to receive specifications of interest with a storage parameter disconnected so that said specifications of interest are not stored on said user interest database.

33. In a telecommunications transmission system adapted to operate as a platform for an agent-based electronic market and including a plurality of user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent-based market interactions between a plurality of agent types, a method of matching a specifications of interest associated with a WebButler, or MerchantAssist, with specifications of interest associated with other agents, characterised by a search engine interacting with WebButlers and MerchantAssists, on request from said WebButlers, or said MerchantAssists, to search a user interest data base and a merchant interest database, to identify other WebButlers and/or MerchantAssists, having associated therewith matching specifications of interest, and by calculating a correspondence rate for each matching specification of interest.

34. A method, as claimed in claim 33, characterised by said merchant servers

having catalogue databases holding information on trade items for which MerchantAssists, associated with said merchant servers, carry specifications of interest, and by accessing said catalogue databases to obtain information to facilitate calculation of said correspondence rate.

35. A method, as claimed in claim 34, characterised by said merchant interest database only holding data relating to product categories and key attributes for trade items for which MerchantAssists carry specifications of interest.

36. A method, as claimed in claim 35, characterised by partitioning data relating to a trade item between mandatory parameters and optional parameters, and by said mandatory parameters including an indication of whether a specification of interest relates to a desire to purchase, or sell, and a product category.

37. A method, as claimed in any of claims 34 to 36, characterised by calculating a correspondence rate, Corr_level, between two statements of interest using the following algorithm:

Corr_level = 1 -(SUM(OP(X)*F(X)))/X

Where:

N = Number of optional parameters in one of said statements of interest

OP(X) = an optional parameter and X has a value between 1 and N, each optional parameter having a value of 1 in the vector

F(X) = a priority weighting factor.

38. A method, as claimed in either claim 36, or claim 37, characterised by, on delivery, by a WebButler, of a first specification of interest to said search engine with a request to identify corresponding specifications of interest, said search engine searching said user interest database and said MerchantAssist database and identifying specifications of interest for which all mandatory parameters match

said first specification of interest and by delivering to said WebButler a list of originators for matching specifications of interest.

39. A method, as claimed in claim 38, characterised by assigning, to WebButlers, logic for collecting data required for calculation of correspondence rates from merchant servers.

40. A method, as claimed in claim 39, characterised by presenting said list of originators to a user as soon as it is available, together with a counter indicating progress toward obtaining additional data needed to calculate correspondence rates, and by said WebButler calculating said correspondence rates and causing said list to be updated as and when said correspondence rates are calculated, said updated list being prioritised and including correspondence rates.

41. A method, as claimed in any of claims 33 to 41, characterised by dynamically synchronising data carried by WebButlers and MerchantAssists with data held by said search engine.

42. A method, as claimed in claim 41, characterised by exchanging the following messages between WebButlers and said search engine, and between MerchantAssists and said search engine:

- "Submit Interest";
- "Update of Interest Profile"; and
- "Reference to Agents with Corresponding Interests".

in order to achieve said dynamic synchronisation.

43. A method, as claimed in any of claims 33 to 42, characterised by said search engine providing value added services including:

- marketing statistics;

- reports on specifications of interest;
- information brokerage; and
- advertising.

44. A method, as claimed in any of claims 33 to 43, characterised by creating specifications of interest with a dynamic editor adapted to request additional information from a user.

45. A method, as claimed in any of claims 33 to 44, characterised by converting specifications of interest from a merchant's format to a format used by said search engine.

46. A method, as claimed in any of claims 33 to 45, characterised by said merchant interest database and said user interest database being country, or region, specific.

47. A method, as claimed in claim 46, characterised by said service provider server having a database containing a black list of product categories which are non-approved for a specific country, or region, and by comparing every new product and/or product attribute with said black list and, if a correspondence is found, rejecting said new product and/or product attribute.

48. A search engine for use with a telecommunications transmission system, as claimed in any of claims 1 to 17, characterised in that said search engine is resident on a service provider server and adapted to receive search instructions from WebButlers and MerchantAssists, to conduct searches on at least two databases, and to access remote databases for additional data.

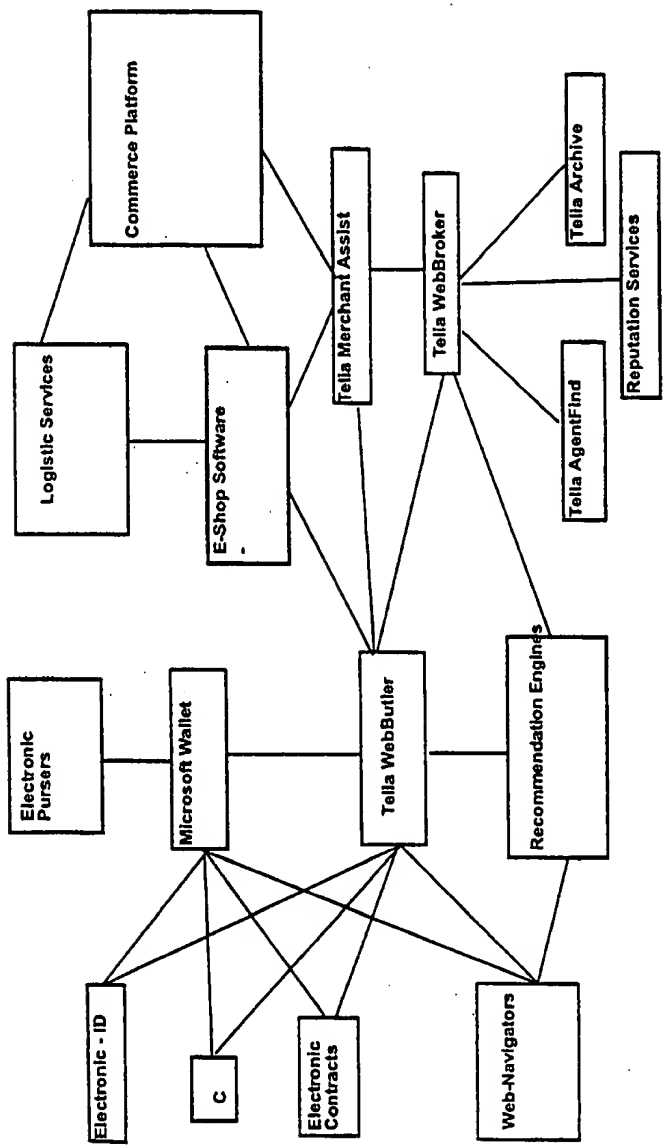

FIGURE 1

SUBSTITUTE SHEET (RULE 26)

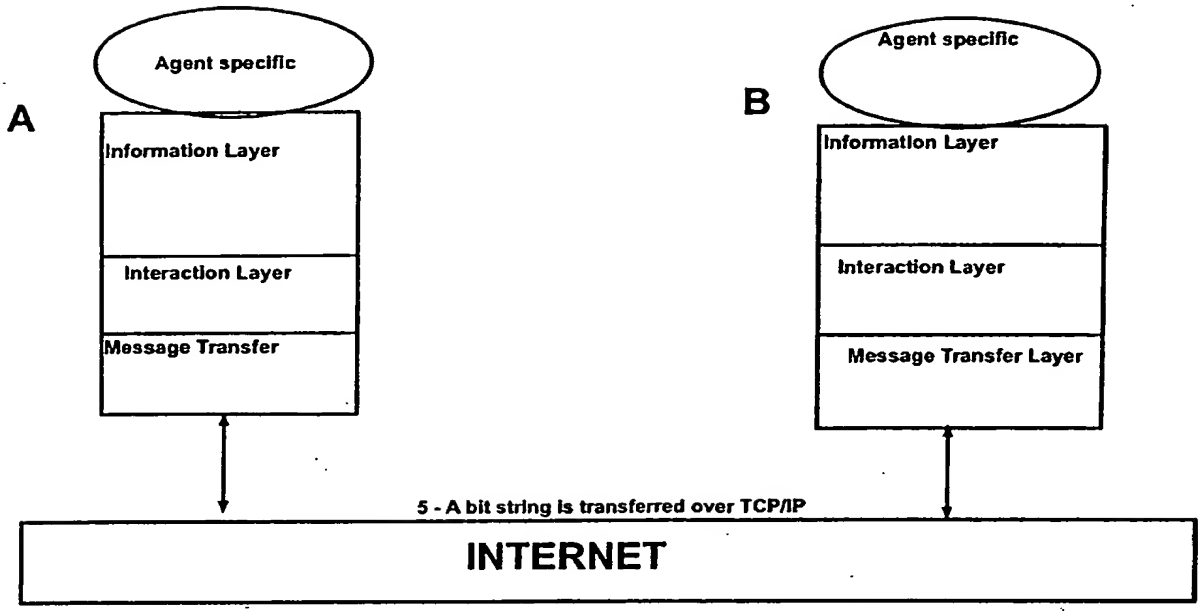

FIGURE 2

SUBSTITUTE SHEET (RULE 26)

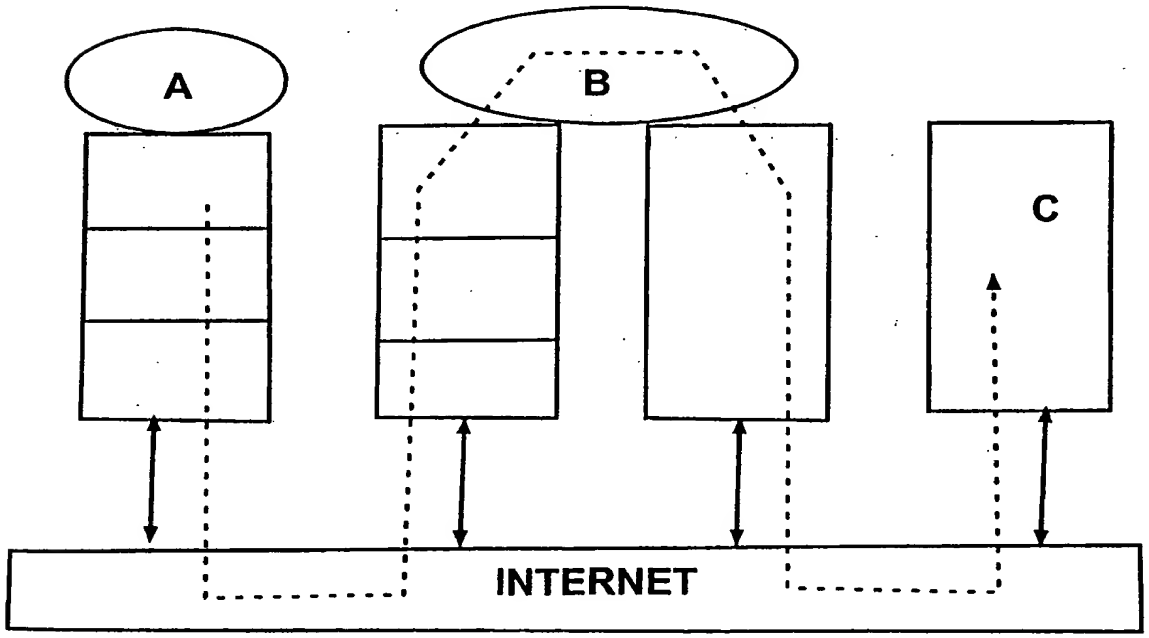

FIGURE 3

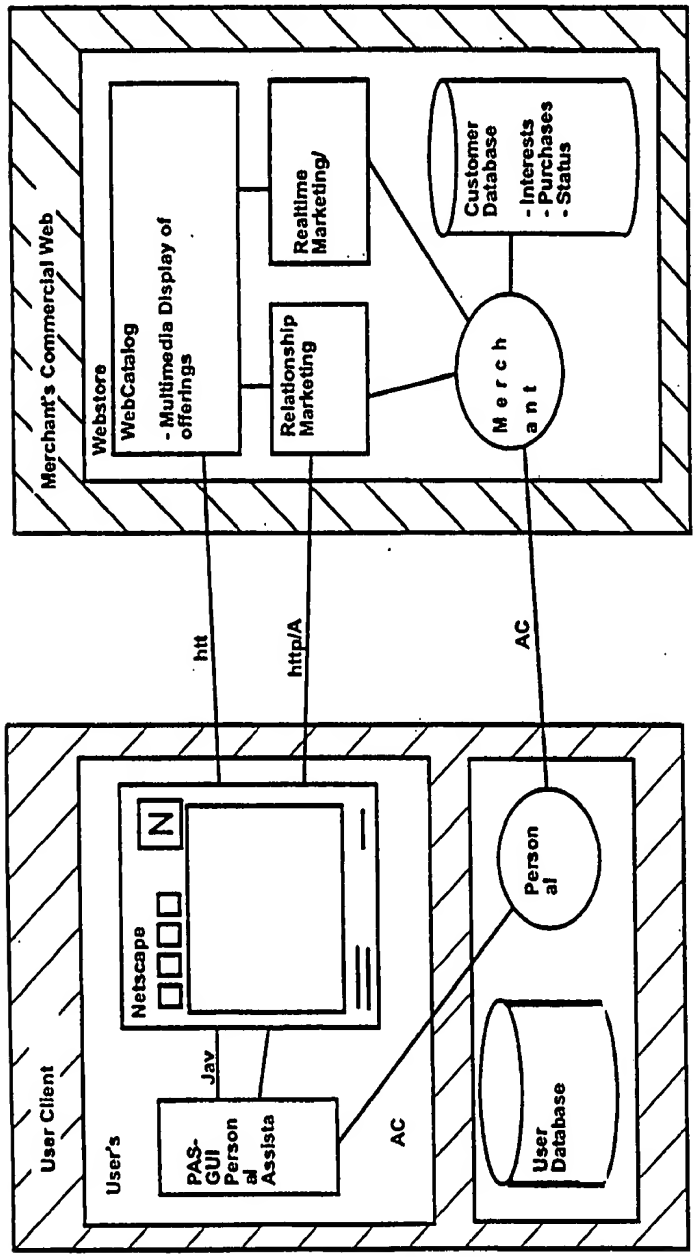

FIGURE 4

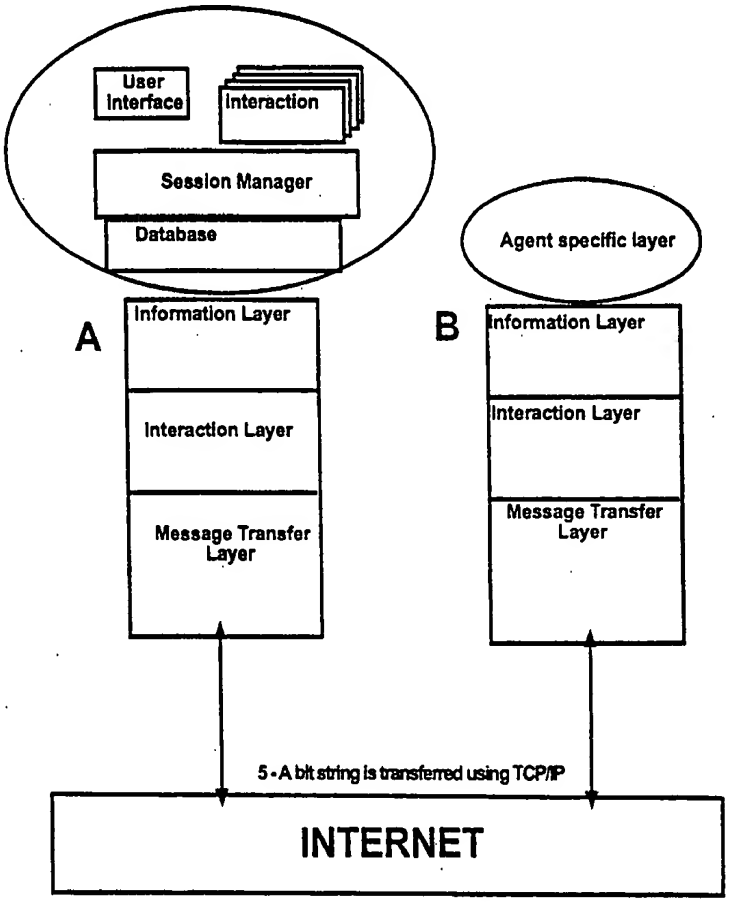

FIGURE 5

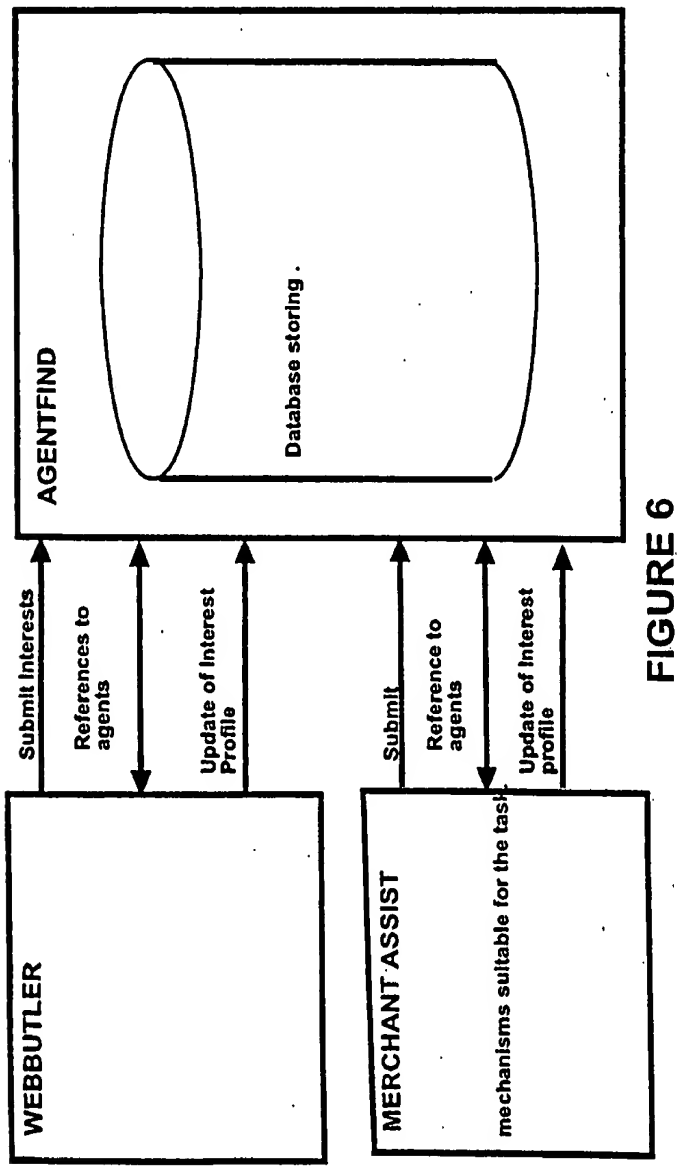

FIGURE 6

AGENTFIND INDEX SERVICE

CLICK ON THIS BANNER TO SIGN-UP
FOR VATTERN-RUNT AND WIN PRIZES

Agents with the largest correspondence:

	Rating
WebButler HighSpeed	0.98
MerchantAssist SportPalace	0.95
WebButler Arnie	0.93
WebButler Susan	0.92
MerchantAssist Reliable	0.82

If you would like to know more details, click on the reference

Requested Interest:

Buy Bianchi Bicycle. At least 21 gears. Not older than 2 years.
If possible, green or blue.
Price less than 300USD.

FIGURE 7

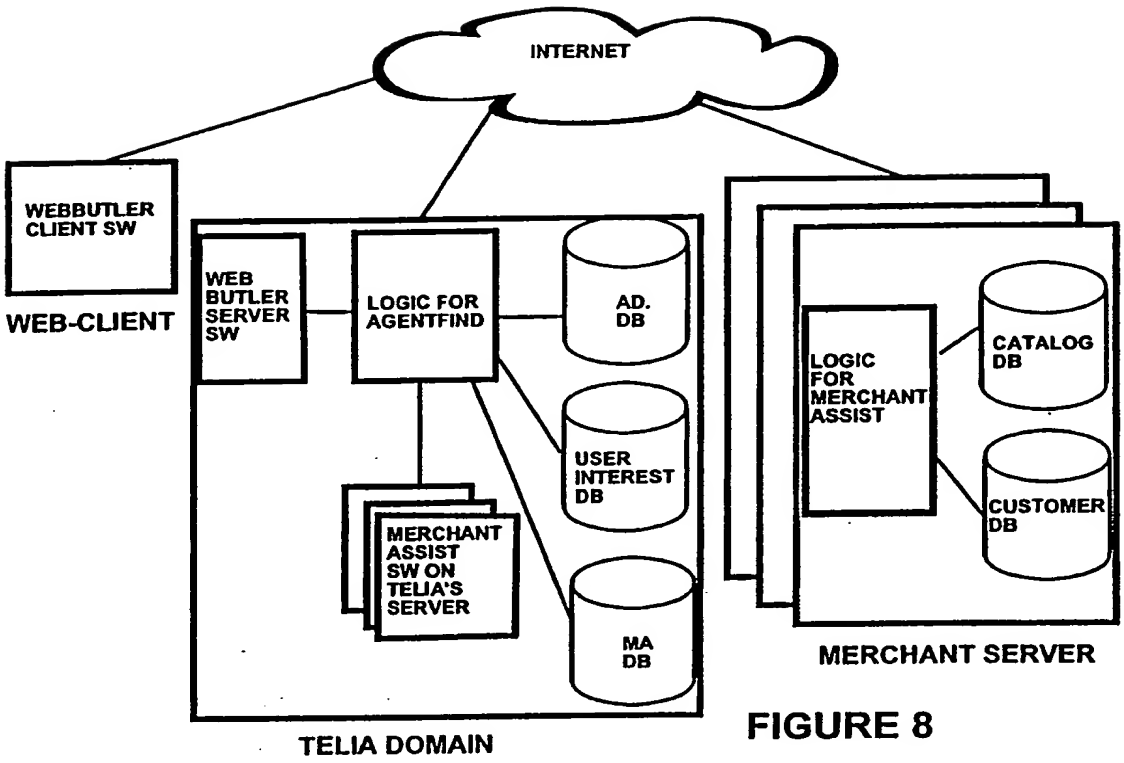

FIGURE 8

SUBSTITUTE SHEET (RULE 26)

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